

Application of Multimedia Theory to an Evaluation of Web-based Multimedia

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Bells and Whistles

- Why do teachers add them?



What Do Theories Say?

- Limited capacity to process information in working memory
- Cognitive overload in working memory decreases learning

Educating Future Teachers

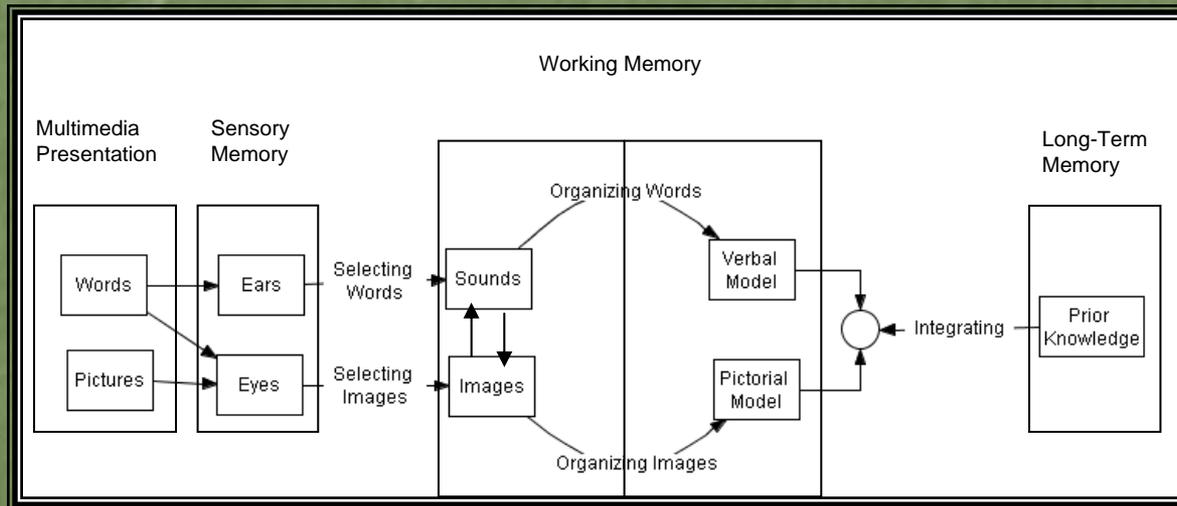
1. Overview for information processing theory
2. Lecture and discussion on multimedia theory
3. Reading literature with the instructor's support
4. Evaluate instructor-selected web-based multimedia to apply knowledge acquired from the reading: in-class discussion
5. Locate a web-based multimedia independently and evaluate using multimedia theory

Overview of Information Processing Theory

- Mental processing in working memory in order for learning to occur
- Limited capacity of working memory

Multimedia: Two Channels

- Mental processing is split into audio and visual channels



Two-channels

- The use of two-channels makes information processing more effective but poor designing causes cognitive overload

Literature students refer to

- Mayer, R. E., & Moreno, R. (2003). Nine ways to reduce cognitive load in multimedia learning. *Educational Psychologist, 38*(1), 43-52
- Students discuss if types 1-5 cognitive overload described in this article exist in a multimedia

Mayer & Moreno (2003)

- Type 1: Split attention
- Type 2: Fast
- Type 3: Too much audio & visual
- Type 4: Confusing presentation
- Type 5: Holding

Please take a note: we will evaluate multimedia

Comprehension Check-up

- What are the five types of cognitive overload in Mayer and Moreno (2003)?
 - Type 1
 - Type 2
 - Type 3
 - Type 4
 - Type 5

Application: We need volunteers to use the web-based multimedia

- Which types of cognitive overload do you observe?

<http://www.scholastic.com/magicschoolbus/games/colgate/>

http://funschool.kaboose.com/formula-fusion/carnival/games/game_math_popper.html

<http://www.primarygames.com/langarts/typingmonster/start.htm>

Comments?



Mayer & Moreno (Multimedia)

Short Essay Assignment

Assessment

Specify the audience for your intended lesson (1 point)

Material is targeted for the intended learners (1 point)

URL of a website intended for instructional use, but causes cognitive overload (2 points)

Use Mayer & Moreno (2003) to explain why the website causes cognitive overload

Clear connection between the cognitive overload theory and the explanation about why the media is inappropriate for classroom use established (5 points)

Correct citation for Mayer & Moreno (2003) using APA format (1 point)

Pre-Post Instructional Comparison

- Research question 1 :Will preservice teachers evaluate web based multimedia that causes cognitive overload in working memory less favorably after the instruction?
- Preservice teachers' scoring went down from 8.04 to 7.01 (N=51). P value in T test was .000

Pre-Post Instructional comparison

- Research Question 2: Will the use of multimedia theory while evaluating a multimedia change as the result of the instruction?

Comments on Web Site			
		Frequency	Percentage (%)
Pre-instruction			
	Not related to multimedia theory	162	89.0%
	Contradicts multimedia theory	5	2.8%
	Supports multimedia theory	15	8.2%
Post-instruction			
	Not related to multimedia theory	113	68.5%
	Contradicts multimedia theory	4	2.4%
	Supports multimedia theory	48	29.1%
<i>Note.</i> N=51. P value in T test = .000			

Sample Comments

- "The music and the timer are more distracting. I pay more attention to the music, and the fact that I was being timed."
- "The ads on the sides of the screen could be distracting."
- "I could not find a button to stop the game. It just keeps going until you lose a certain number of times."

Pre-Post Instructional Comparison

- Research Question 3: Will preservice teachers have favorable opinions about web-based multimedia that causes cognitive overload in working memory prior to instruction?

Sample Comment

- “The overall score was a 10 on the first evaluation and an 8 on the second evaluation. There were six justifications on the first evaluation and five justifications on the second evaluation. Most of the justifications remained the same on the first and second evaluation. One of the differences was that I thought the music and the balloons would motivate students on the first evaluation and distract students on the second evaluation. Another difference was the timer, which I thought could be a distraction on the second evaluation. I think my evaluations changed after learning about cognitive overload.”

References

- Mayer, R. E. (2001). *Multimedia learning*. Cambridge, UK: Cambridge University Press.
- Mayer, R. E., & Moreno, R. (2003). Nine ways to reduce cognitive load in multimedia learning. *Educational Psychologist, 38*(1), 43-52.